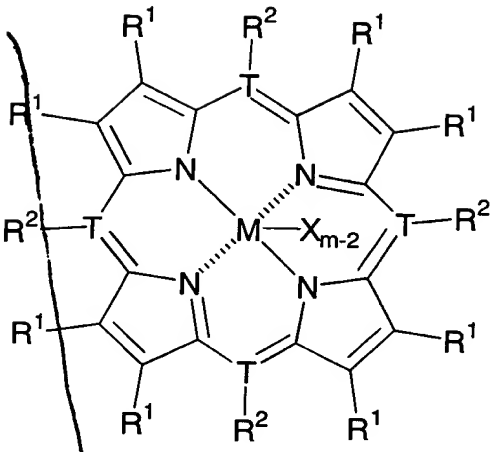
WHAT IS CLAIMED IS:

1. A catalyst component for addition polymerization comprising (A) a compound containing an atom of the Group II to the Group XII or Lanthanide series of the Periodic Table of the Elements, in which the lowest energy level of unoccupied molecular orbital having the valence p-type atomic orbital of the atom of the Group II to the Group XII or Lanthanide series as a main component (wherein the coefficient represented by a linear combination is 0.4 or more) is calculated to be 0.008 atomic unit (Hartree) or less by the calculation of density functional method (B3LYP/3-21G level).

2. The catalyst component according to claim 1, wherein the compound (A) is a porphyrin or phthalocyanine complex in which the metal atom of the Group II to the Group XII or Lanthanide series is coordinated.

3. The catalyst component according to claim 2, the compound (A) is a compound represented by the general formula [1]:



[1]

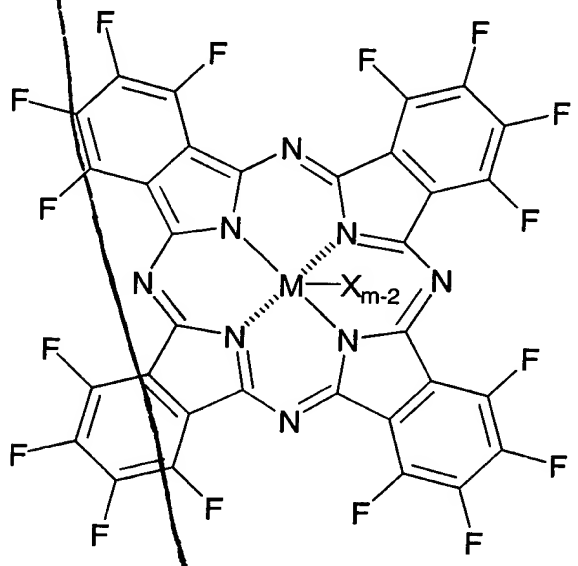
(wherein M represents an atom of the Group II to the Group XII or Lanthanide series of the Periodic Table, T represents an atom of the Group XIV or Group XV of the Periodic Table, and all of T's may be mutually the same or different. Each of R^1 and R^2 independently is a hydrogen atom, a halogen atom, a hydrocarbon group or a halogenated hydrocarbon group, all of R^1's and all of R^2's may be mutually the same or different, and may mutually form a ring. X represents a hydrogen atom, a halogen atom, a hydrocarbon group or a hydrocarbon oxy group, and when a plural number of X's exist, they may be mutually the same or different. m represents a valence of M.)

4. A catalyst component according to Claim 3, wherein at least one of R^1 and R^2 in the general formula [1] is an electron-withdrawing group.

5. A catalyst for addition polymerization according to Claim 4, wherein the electron-withdrawing group is

a fluorine, chlorine or bromine atom.

6. A catalyst component according to Claim 5, wherein the compound(A) is a compound represented by the general formula [2]:



[2]

(wherein M represents an atom of the Group II to the Group XII excluding Cu or Lanthanide series of the Periodic Table, X represents a hydrogen atom, a halogen atom, a hydrocarbon group or a hydrocarbonoxy group, and when a plural number of X's exist, they may be mutually the same or different. m represents a valence of M.)

7. The catalyst component according to Claims 2, wherein M is an atom of the Group IX or Group XII.

8. A catalyst for addition polymerization obtained by contacting the compound (A) of claim 1, a metal compound (B) selected from the group consisting of compounds represented by the general formula [4]:

$$L_a M^1 X_b \qquad [4]$$

(wherein M^1 is a metal atom of the Group III to the Group XIII or Lanthanide series; L is a group having cyclopentadienyl type anion skeleton or a group containing a hetero atom, a plurality of L's may be linked directly, or through a residual group containing a carbon atom, a silicon atom, a nitrogen atom, an oxygen atom, a sulfur atom or a phosphorous atom; X is a halogen atom or a hydrocarbon group; "a" represents a number satisfying $0<a\leqq 8$; and "b" represents a number satisfying $0<b\leqq 8$.) and μ-oxo type compounds thereof.

9. A catalyst for addition polymerization obtained by contacting the compound (A) of claim 1, a metal compound (B) selected from the group consisting of compounds represented by the general formula [4]:

$$L_a M^1 X_b \qquad [4]$$

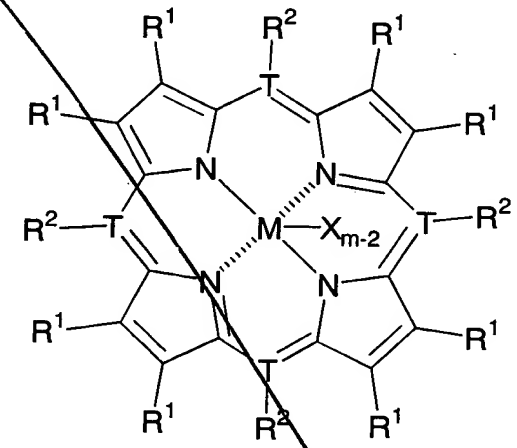
(wherein M^1 is a metal atom of the Group III to the Group XIII or Lanthanide series; L is a group having cyclopentadienyl type anion skeleton or a group containing a hetero atom, a plurality of L's may be linked directly, or through a residual group containing a carbon atom, a silicon atom, a nitrogen atom, an oxygen atom, a sulfur atom or a phosphorous atom; X is a halogen atom or a hydrocarbon group; "a" represents a number satisfying $0<a\leqq 8$; and "b" represents a number satisfying $0<b\leqq 8$.) and μ-oxo type compounds thereof, and an organoaluminum compound (C).

10. The catalyst according to claim 8, wherein the

compound (A) is a porphyrin or phthalocyanine complex in which a metal atom of the Group II to the Group XII is coordinated.

11. The catalyst according to claim 9, wherein the compound (A) is a porphyrin or phthalocyanine complex in which a metal atom of the Group II to the Group XII is coordinated.

12. The catalyst according to claim 10, the compound (A) is a compound represented by the general formula [1]:

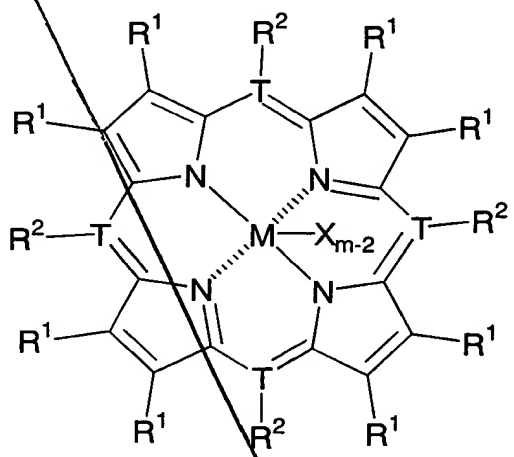


[1]

(wherein M represents an atom of the Group II to the Group XII or Lanthanide series of the Periodic Table, T represents an atom of the Group XIV or Group XV of the Periodic Table, and all of T's may be mutually the same or different. Each of R^1 and R^2 independently is a hydrogen atom, a halogen atom, a hydrocarbon group or a halogenated hydrocarbon group, all of R^1's and all of R^2's may be mutually the same or different, and may mutually form a ring. X represents a hydrogen atom, a

halogen atom, a hydrocarbon group or a hydrocarbon oxy group, and when a plural number of X's exist, they may be mutually the same or different. m represents a valence of M.)

13. The catalyst according to claim 11, the compound (A) is a compound represented by the general formula [1]:



[1]

(wherein M represents an atom of the Group II to the Group XII or Lanthanide series of the Periodic Table, T represents an atom of the Group XIV or Group XV of the Periodic Table, and all of T's may be mutually the same or different. Each of R^1 and R^2 independently is a hydrogen atom, a halogen atom, a hydrocarbon group or a halogenated hydrocarbon group, all of R^1's and all of R^2's may be mutually the same or different, and may mutually form a ring. X represents a hydrogen atom, a halogen atom, a hydrocarbon group or a hydrocarbon oxy group, and when a plural number of X's exist, they may be mutually the same or different. m represents a valence

of M.)

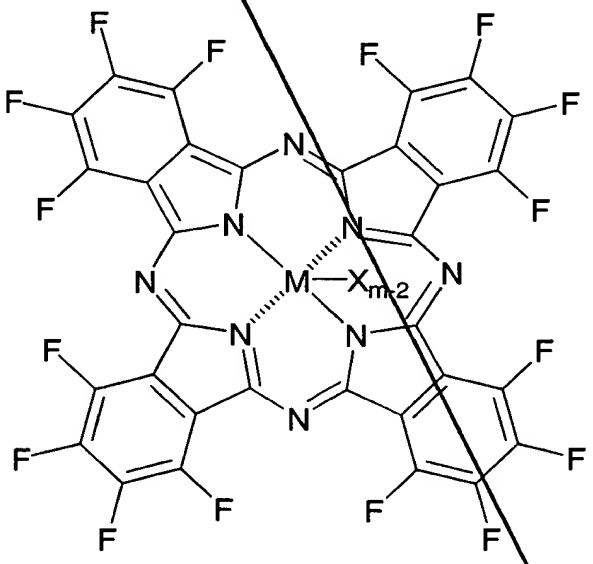
14. The catalyst according to Claim 12, wherein at least one of R^1 and R^2 in the general formula [1] is an electron-withdrawing group.

15. The catalyst according to Claim 13, wherein at least one of R^1 and R^2 in the general formula [1] is an electron-withdrawing group.

16. The catalyst according to Claim 14, wherein the electron-withdrawing group is a fluorine, chlorine or bromine atom.

17. The catalyst according to Claim 15, wherein the electron-withdrawing group is a fluorine, chlorine or bromine atom.

18. The catalyst according to Claim 16, wherein the compound is a compound represented by the general formula [2]:

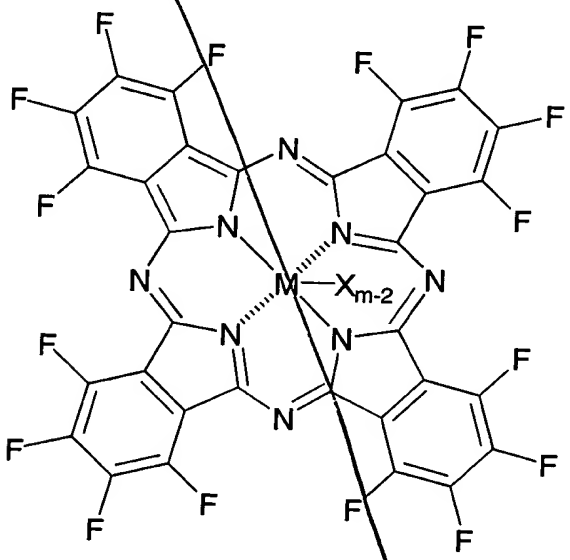


[2]

(wherein M represents an atom of the Group II to the Group

XII excluding Cu, or Lanthanide series of the Periodic Table, X represents a hydrogen atom, a halogen atom, a hydrocarbon group or a hydrocarbon oxy group, and when a plural number of X's exist, they may be mutually the same or different. m represents a valence of M.)

19. The catalyst according to Claim 17, wherein the compound is a compound represented by the general formula [2]:



[2]

(wherein M represents an atom of the Group II to the Group XII excluding Cu or Lanthanide series of the Periodic Table, X represents a hydrogen atom, a halogen atom, a hydrocarbon group or a hydrocarbon oxy group, and when a plural number of X's exist, they may be mutually the same or different. m represents a valence of M.).

20. The catalyst according to Claims 18, wherein M is an atom of the Group IX or Group XII.

21. The catalyst according to Claims 19, wherein

M is an atom of the Group IX or Group XII.

22. The catalyst according to claim 8, wherein the compound(B) is a metallocene compound.

23. The catalyst according to claim 9, wherein the compound(B) is a metallocene compound.

24. A process for producing an addition polymer, which comprises polymerizing an addition polymerizable monomer in the presence of the catalyst of claim 8.

25. A process for producing an addition polymer, which comprises polymerizing an addition polymerizable monomer in the presence of the catalyst of claim 9.

26. A process for producing an addition polymer, which comprises polymerizing an addition polymerizable monomer in the presence of the catalyst of claim 22.

27. A process for producing an addition polymer, which comprises polymerizing an addition polymerizable monomer in the presence of the catalyst of claim 23.

28. The process according to Claim 24, wherein the addition polymerizable polymer is an olefin.

29. The process according to Claim 25, wherein the addition polymerizable polymer is an olefin.

30. The process according to Claim 28, wherein the olefin is a mixture of ethylene and α-olefin.

31. The process according to Claim 29, wherein the olefin is a mixture of ethylene and α-olefin.